

CHAPTER XXIV

FISCAL MULTIPLIERS

To understand fully the effect of a fiscal action one has to be familiar with the concept of multipliers. A small change in investment or government expenditure has a multiplied effect on income. Multiplier is number of times a change in government expenditure or investment produces a change in income. If an increase in government expenditure of \$100 million increases income (GDP) by \$400 million, then the expenditure multiplier is 4. It has increased income four times the increase in government expenditure.

There are four different types of multiplier, which are:

1. Investment/government expenditure multiplier
2. Tax multiplier
3. Balanced budget multiplier
4. Open economy multiplier

INVESTMENT/GOVERNMENT EXPENDITURE MULTIPLIER

Since both investment and government expenditure multipliers work the same way, they are discussed together. How a small change in government expenditure produces a multiplied effect on income can be explained with the help of an example. Suppose government hires an economic consultant and pays \$10,000 for his/her services. Marginal propensity to consume (MPC) of people is .75. (Marginal propensity to consume is the portion of income people spend from an incremental change in income. The marginal propensity to consume of .75 means that people spend 75% of their incremental income, and save the rest.) In the above example, when the government spends \$ 10,000, it right away increases income of the economic consultant by \$10,000. What would the economic consultant do with this income? If the marginal propensity to consume is .75, he/she will spend \$7,500 (\$10,000 × .75), and save the rest which will be \$2,500 (\$10,000 - \$7,500). Let us say that the economic consultant purchases

furniture with this income. This will increase income of the furniture manufacturer by \$7,500. The furniture manufacturer will do the same thing with the additional income as the economic consultant -- spend \$5,625 (\$7,500 × .75), and save the rest. This cycle will continue until income of the last individual drops down to zero. This process is summarized in Table 24-1.

TABLE 24-1
WORKING OF MULTIPLIER

Round	Income	
1	\$10,000	----- Primary effect
2	(\$ 10,000 × .75) = 7,500	----- Secondary effect
3	(\$ 7,500 × .75) = 5,625	
4	(\$ 5,625 × .75) = 4,219	
-	= ----	
-	= ----	
Total	= \$40,000	----- Full effect

The above table shows that an increase in government expenditure of \$10,000 led to increase in income by \$40,000. How did we arrive at this number? We first computed the multiplier, and then used the multiplier to arrive at the total increase in income. The formula of multiplier is:

$$k = \frac{1}{1 - MPC} \quad \dots (24-1)$$

If MPC = .75, then k (multiplier) will be:

$$k = \frac{1}{1 - .75} = 4$$

Since multiplier is 4, total increase in income from a \$10,000 increase in government expenditure will be \$40,000 (\$10,000 × 4). The above example describes overall effect of an increase in government expenditure on income. The result would have been the same if private investment was increased by the same amount. (In other words, an increase in private investment of \$10,000

would have also increased total income by \$40,000, assuming MPC is .75.)

Multiplier works both ways. The above example shows a multiplied increase in income from an increase in government expenditure. The opposite would have been the case if the government reduced expenditure by \$10,000. Then, income would have declined by a multiplied amount, that is, by \$40,000.

TAX MULTIPLIER

To understand the tax multiplier, we have to know different effects of a multiplier which are three in total: (1) Primary effect, (2) secondary effect and (3) full effect (see Table 24-1). The primary effect is the initial effect. In the above example, primary effect is \$10,000. A \$10,000 increase in government expenditure initially increases income by \$10,000. The secondary effect is sumtotal of effect after the initial effect which, in the above example, is \$30,000 (\$40,000 - \$10,000). The full effect is the sumtotal of initial and secondary effects which comes to \$40,000 (\$30,000 + \$10,000). Each of these effects can be translated into a multiplier, that is, primary multiplier, secondary multiplier and full multiplier.

The primary multiplier is always equal to 1. If the government increases expenditure by \$10,000, initial increase in income will also be \$10,000 (\$10,000 × 1); if it increases by \$20,000, initial increase in income will also be \$20,000 (\$20,000 × 1); and so on. (See Equation 24-2)

Just like the secondary effect, the secondary multiplier is the difference between full multiplier and primary multiplier. All the multipliers, primary, secondary and full, are algebraically expressed in Equation 24-2, Equation 24-3, and Equation 24-4 (same as Equation 24-1) respectively. The secondary multiplier is also called tax multiplier. All these multipliers are the multipliers of a closed economy because they do not account for imports. The multipliers of an open economy -- the ones which account for imports -- will be described later.

To taxes, secondary multiplier is applicable. When government reduces taxes in an attempt to stimulate the economy, it does not affect gross income of people. Thus, it has no initial effect. However, their take-home pays (disposable income) are affected which affect their consumption and consequently income

$$\text{Primary multiplier } k = 1 \quad \dots (24-2)$$

$$\text{Secondary multiplier } k = \frac{MPC}{1 - MPC} \left[\frac{1}{1 - MPC} - 1 \right] \quad \dots (24-3)$$

$$\text{Full Multiplier } k = \frac{1}{1 - MPC} \left[1 + \frac{MPC}{1 - MPC} \right] \quad \dots (24-4)$$

of others. When one spends, as explained earlier, income of others rise. Since taxes have only secondary effect (that is, no primary effect), only secondary multiplier is applicable. In the above example, if government decides to reduce taxes (instead of raising expenditure) by \$10,000 and MPC is .75, then the multiplier (secondary multiplier/tax multiplier) will be:

$$k = \frac{.75}{1 - .75} = 3$$

If multiplier is 3, then \$10,000 reduction in taxes will increase income by \$30,000 (\$10,000 × 3).

BALANCED BUDGET MULTIPLIER

Budget is balanced when government increases its expenditure and at the same time increases taxes by the same amount. The multiplier for such a policy action is called balanced budget multiplier, which is always equal to 1 ($k = 1$). Increase in government expenditure increases income by a full multiplier (which includes primary and secondary multipliers). Increase in taxes reduces income only by the secondary multiplier. Therefore, the net effect of such a policy will be by the multiplier of one (full multiplier of government expenditure minus secondary multiplier of increase in taxes). Algebraically, it can be written as follows:

$$k = \frac{1}{1 - MPC} - \frac{MPC}{1 - MPC} = 1 \quad \dots (24-5)$$

If the government increases expenditure by \$10,000 and at the same time

increases taxes by the same amount, the budget is balanced. Such a policy will increase income only by the primary multiplier, that is, by \$10,000 (\$10,000 × 1).

The balanced budget multiplier of 1 assumes that marginal propensity to consume of those who are affected by government expenditure and taxes are the same. If they are different, then the multiplier of 1 will not hold.

OPEN ECONOMY MULTIPLIER

So far we have discussed the multiplier in a closed economy, that is, economy without a foreign trade sector. In a closed economy, there is only one leakage, which is saving. The size of a multiplier depends, among other things, on the marginal propensity to consume. Higher the marginal propensity to consume (lower the marginal propensity to save), larger will be the multiplier. Now we will discuss the multiplier in an open economy where there are two leakages, saving and imports. Imports are also a leakage because money spent on imported goods does not increase our income. Because of two leakages, the size of multiplier of an open economy is always smaller than that of a closed economy. The primary, secondary and full multipliers of a closed economy are as follows:

$$\text{Primary Multiplier } k = 1 \quad (24-6)$$

$$\text{Secondary Multiplier } k = \frac{MPC - MPM}{1 - MPC + MPM} \left[\frac{1}{1 - MPC + MPM} - 1 \right] \quad (24-7)$$

$$\text{Full Multiplier } k = \frac{1}{1 - MPC + MPM} \left[1 + \frac{MPC - MPM}{1 - MPC + MPM} \right] \quad (24-8)$$

Here MPM stands for marginal propensity to import. Full multiplier will be applicable to government and investment expenditures (Equation 24-8). Let's say that government increases expenditure by \$10,000. The marginal propensity to consume and marginal propensity to imports are .75 and .10 respectively. As income increases, people spend a certain portion of their income on imports. The marginal propensity to import of .10 means that for every dollar increase in income people spend 10 cents of it on imported goods. In that case, open

economy multiplier will be:

$$k = \frac{1}{1 - .75 + .10} = 2.86$$

Here the multiplier comes to 2.86. This is smaller than the multiplier of a closed economy, which was 4. This is because open economy has an additional leakage, which is imports. Since open economy multiplier is 2.86, increase in government expenditure by \$10,000 will increase income by \$28,600.

Here again secondary multiplier will be applicable to taxes (Equation 24-7). If the government decides to reduce taxes instead of increasing expenditure, everything else remains same, then the multiplier will be:

$$k = \frac{.75 - .10}{1 - .75 + .10} = 1.86$$

This means then \$10,000 reduction in taxes will increase income by \$18,600. If the government increases expenditure and taxes by the same amount, then balanced budget multiplier (Equation 24-6) will be applicable.

DIFFERENT ASPECTS OF MULTIPLIER

To explain different aspects of the multiplier, we will discuss four different problems.

Problem 1: What would be the effect of each of these policies in a closed economy:

- i. Deficit spending
- ii. Deficit without spending
- iii. Spending without deficit

Solution: i. If deficit in the budget occurs because of increase in government expenditure and taxes do not change, then the income will increase by a full multiplier (Equation 24-4). As explained earlier, the government expenditure has a full multiplier.

- ii. Deficit without spending means that government reduces taxes

without changing expenditure. Here income will increase by the secondary multiplier (tax multiplier, Equation 24-3). As explained before, secondary multiplier is applicable to taxes.

- iii. Spending without deficit means that government raises expenditure and taxes by the same amount. This is how government can increase expenditure without creating a deficit. Here balanced budget multiplier, which is one, will be applicable (Equation 24-2). It is assumed here that the marginal propensity to consume of those who are affected by government expenditure and taxes is the same.

Problem 2: What would be the effect if the fiscal authority takes a following course of action in a closed economy?

- i. Increases expenditure by \$10 mil. Those who are affected by it their MPC is $\frac{3}{4}$.
- ii. Increases taxes by \$10 mil. Those who are affected by it their MPC is $\frac{2}{3}$.

Solution: Here we cannot use balanced budget multiplier because the MPC of those who are affected by the increase in government expenditure is not the same as those who are affected by the increase in taxes. Therefore, we have to compute the effect of both separately. Net effect on income will be the effect of increase in government expenditure minus the effect of increase in taxes.

As explained earlier, full multiplier (as shown in Equation 24-4) is applicable to government expenditure. This means then the multiplier for government expenditure will be:

$$k = \frac{1}{1 - \frac{3}{4}} = 4$$

If the multiplier for government expenditure is 4, then \$10 million increase in government expenditure will increase income by \$40 mil. ($\10×4).

Again, as explained before, the secondary multiplier (as shown in Equation 24-3) is applicable to taxes. This means then the multiplier for taxes will be:

$$k = \frac{\frac{2}{3}}{1 - \frac{2}{3}} = 2$$

If the multiplier for taxes is 2, then \$10 mil. increase in taxes will decrease income by \$20 mil. ($\10×2).

Under these conditions, the above policy in total will increase income by \$20 mil. ($\$40 - \20).

Problem 3: What would be the effect if the fiscal authority takes a following course of action in a closed economy:

- i. Increases expenditure by \$10 mil. Those who are affected by it their MPC is $\frac{3}{4}$.
- ii. Reduces taxes by \$5 mil. Those who are affected by it their MPC is $\frac{1}{2}$.

It is assumed here that the above actions will reduce (crowd out) private investment by \$5 mil. Those who will be affected by it their MPC is $\frac{1}{4}$.

Solution: In order to get the net effect, we have to first compute separately the effect of each action. Then we will add and subtract depending on whether an action increases or decreases income.

The government expenditure will have a full multiplier (Equation 24-4), which comes to:

$$k = \frac{1}{1 - \frac{3}{4}} = 1.6$$

This means then an increase in government expenditure by \$10

mil. will increase income by \$16 mil.

Taxes will have a secondary multiplier (Equation 24-3), which comes to:

$$k = \frac{\frac{1}{2}}{1 - \frac{1}{2}} = 1$$

Reduction in taxes by \$5 mil. will also increase income. Since its multiplier is 1, it will increase income by the same amount, that is, by \$5 mil. (\$5 × 1).

Reduction in private investment will reduce income. Since full multiplier (Equation 24-4) is applicable to investment, its multiplier comes to:

$$K = \frac{1}{1 - \frac{1}{3}} = 1.5$$

With the multiplier of 1.5, \$5 mil. reduction in private investment will reduce income by \$7.5 mil.

If we know the effect of each action, we can calculate the net effect, which comes to increase in income by \$13.5 mil. (\$16 + \$5 - \$7.5).

Problem 4: What would be the effect on an economy if the fiscal authority takes a following course of action in an attempt to dampen inflation in an open economy:

- i. Reduces expenditure by \$10 mil. Those who are affected by it their MPC is $\frac{2}{3}$.
- ii. Raises taxes by \$5 mil. Those who are affected by it their MPC is $\frac{1}{4}$.

The above policy will have an effect on income which in turn will

affect the nation's imports. (Imports increase as income increases.) Marginal propensity to import is assumed to be .10.

Solution: Here again we will calculate separately the effect of \$10 mil. reduction in government expenditure and of \$5 mil. increase in taxes. Since both these actions have a dampening effect on the economy, we will combine their effects in order to obtain the overall negative effect on income. The reduction in government expenditure will have a full multiplier in an open economy (Equation 24-8), which comes to:

$$k = \frac{1}{1 - \frac{2}{3} + \frac{1}{10}} = 2.31$$

This means then \$10 mil. reduction in government expenditure will reduce income by \$23.10 mil.

The secondary multiplier (Equation 24-7) will be applicable to taxes, which comes to:

$$k = \frac{\frac{1}{4} - \frac{1}{10}}{1 - \frac{1}{4} + \frac{1}{10}} = .18$$

This means then tax increase of \$5 mil. will reduce income by \$.90 mil. (5 × .18).

From the above information we can calculate the net effect on income, which comes to reduction in income by the amount of \$24 mil. (\$23.10 + \$.90).

The above discussion of multiplier is nothing more than an oversimplified version of what happens when the fiscal authority takes a certain course of action. There are a number of other things which impact the economy but are not accounted for in the multiplier. For example, the effect of an expansionary fiscal action depends, among other things, on how the deficit is financed. If it is financed by printing more notes, as is done in many underdeveloped countries, the effect may very well be more on prices and less on output. In other words, nominal income may rise much more than the rise in real income.

If it is financed by borrowing from the market, it may raise the interest rates, which, in turn, may reduce private investment. (If we can predict how much private investment will fall resulting from a given expansionary fiscal action and we know the marginal propensity to consume of those who would be affected by it, we can make an adjustment in the final outcome.) Also, people who lend money to the government to finance its deficit might have otherwise spent a portion of it. This would have a dampening effect on the economy. Money borrowed by the government has to be paid back sooner or later. In that case, increase in current government expenditure means higher taxes in the future.

Fixed or flexible exchange rate system can also make a difference. In an economy with a fixed exchange rate, expansionary fiscal action will raise income as well as imports. As explained earlier, when income of people increases, they spend a portion of their income on imports. (Of course, if we can predict the effect on imports, we can account for.) But, in an economy with flexible fixed exchange rates, imports may not be affected at all. An increase in imports, other things remaining constant, will lower the value of dollar. This will, in turn, make imported goods more expensive. As a result, imports will decline.

Furthermore, the multiplier simply explains the overall effect. It does not indicate how much time it will take to generate the full effect. The full effect may be realized within a year or more than a year. The multiplier does not specify the time frame within which it will happen.

SUMMARY

Multiplier states by how many times a given change in investment or expenditure affects income. There are different multipliers for closed and open economies. The closed economy assumes there is no foreign trade sector. The multiplier for open economy is always smaller than that of a closed economy. This is because open economy has two leakages -- saving and imports -- and closed economy has just one -- saving. Full multiplier is applicable to government expenditure and investment. Secondary multiplier is applicable to taxes. Primary multiplier is applicable when increase in expenditure is fully offset by the increase in taxes (that is, when budget is balanced). It is assumed here that the marginal propensity to consume of those who are affected by expenditure and taxes is the same. Otherwise, primary multiplier ($k = 1$) will not hold. The concept of multiplier explains in simple terms what happens to the

economy when fiscal authority takes a certain course of action. The actual effect on the economy depends on many other things such as how government finances the additional spending, and whether the economy has a fixed or flexible exchange rates.

QUESTIONS FOR REVIEW

1. What do we mean by multiplier? How does it work?
2. Explain in detail primary, secondary and full multipliers.
3. Describe why the multiplier for taxes is always smaller than that of government expenditure.
4. Explain why the multiplier of an open economy is smaller than that of a closed economy.
5. What is balanced budget multiplier? How does it work?
6. Explain in brief the followings:
 - i. Deficit spending
 - ii. Deficit without spending
 - ii. Spending without deficit
7. How reliable is multiplier in estimating the effect of a fiscal policy? Does it take into account everything which has a bearing on the economy?
8. Suppose the government wants to dampen the economy in an attempt to control inflation. The economy is assumed to be closed one. It takes following actions:
 - i. It reduces government expenditure by \$20 mil. Those who are affected by it their MPC is $\frac{3}{4}$.
 - ii. Raises taxes by \$5 mil. Those are affected by it their MPC is $\frac{1}{2}$.

What would be the effect of the above policy action?

Ans. - \$85 mil.

9. What would be the effect if the fiscal authority takes a following course of